form the subject of the present memoir. With the form of gas battery last described in that paper, by which the interfering action of the external air is excluded, he finds that deutoxide of nitrogen associated with oxygen gives a continuous voltaic current; and that the volumes respectively absorbed by the electrolyte are as four to one, indicating the formation of hyponitrous acid.

Passing to the more immediate object of the present paper, he states that having observed nitrogen procured by the combustion of phosphorus to give rise, in the gas battery, to a temporary voltaic current, he was led to believe that phosphorus, although an insoluble non-conductor, might, by means of the gas battery, be made the excitant of a continuous voltaic current, analogous to the zinc element of an ordinary voltaic combination. This expectation was verified by experiments, a series of which is given; phosphorus being suspended in various gases and voltaically associated with oxygen. The experiments were continued during several months, and the results indicated the same consumption of phosphorus with reference to the oxygen, as would occur by the formation of phosphorous acid; the phosphorus being thus burned by oxygen at a distance. Phosphorus and iodine, both non-conducting solids, being each suspended in nitrogen in the associated tubes of a gas battery, give a continuous voltaic current, and are consumed in equivalent ratios. Sulphur, suspended in nitrogen and associated with oxygen, gives a voltaic current when fused. Other volatile electro-positive bodies, such as camphor, essential oils, æther and alcohol, when placed in nitrogen and associated with oxygen, gave a continuous voltaic current.

The author observes that the gas battery, which in his former experiments introduced gases, by the present experiments renders solid and liquid insoluble non-conductors the exciting constituents of voltaic combinations, and enables us to ascertain their electro-chemical relations: it also introduces the galvanometer as a test of vaporization.

A new form of gas battery is described, in which an indefinite number of cells are charged by the hydrogen evolved from a single piece of zinc; the oxygen of the atmosphere supplying the electro-negative element. The charge of the battery is self-sustained, in a manner somewhat similar to the Doebereiner light apparatus.

"The Blood-Corpuscle considered in its different phases of development in the Animal Series." By Thomas Wharton Jones, Esq., F.R.S., Lecturer on Anatomy, Physiology and Pathology, at the Charing Cross Hospital.

This paper is divided into three parts: the first relating to the blood-corpuscles of the Vertebrata; the second to those of the Invertebrata; and the last to a comparison between the two. He first describes the microscopic appearances of these corpuscles in different classes of vertebrate animals, beginning with the skate and the frog, and proceeding to birds and mammifera; first in their early embryonic state, and next in the subsequent periods of their growth. He finds in oviparous vertebrata generally, four principal forms of

corpuscles. These he distinguishes as the phases, first of the *granule blood-cell*, which he describes as a cell filled with granules, disclosing by the solvent action of dilute acetic acid on these granules a vesicular, or as the author terms it, a "*cellæform*" nucleus. These granule cells appear under two stages of development, namely, the coarsely granulous stage and the finely granulous stage. The second phase is that of the *nucleolated blood-cell*, oval in shape, containing a vesicular (or "cellæform") nucleus, and red-coloured matter. These cells likewise appear under two stages of development; colourless in the first and coloured in the second, in which last stage it constitutes the *red corpuscle*. In the early mammiferous embryo, he finds, in addition to the former, a third phase, that of *free vesicular nucleus*, exhibiting, like the nucleolated cell, the colourless and the coloured stages.

On examining the corpuscles of the lymph of vertebrate animals, the author finds them in all the classes to be identical in structure with their blood-corpuscles, and differing only in the inferior degree of coloration attending their last stage. In the oviparous classes, he observes that the nucleolated are more numerous than the granule cells, while in the mammifera the latter are predominant, which is the reverse of the proportion in which they exist in the blood of these animals. He finds that some of the nucleolated cells of the contents of the thoracic duct exhibit a marked degree of coloration, and have an oval shape; thus offering a resemblance to the blood of the early embryonic state.

The blood-corpuscles of all the invertebrate animals in which the author examined them, present the same phases of granule and nucleolated cells as in the higher classes, except that in the last stage of the latter phase the coloration is very slight, but the vesicular nucleus is frequently distinctly coloured. As in the higher classes, corpuscles exist in different states of transition from the granular to the nucleolated form of cell. In some of the invertebrata, corpuscles are found which appear to be the nuclei of some of the nucleolated cells become free; and these the author considers to be abortions, rather than examples, of cells having attained their third phase of free cells. Corpuscles are also met with in these animals, in greater or less abundance, belonging to the lowest forms of organic elements, namely, elementary granules.

The comparison which the author institutes between the blood-corpuscles of the vertebrate and invertebrate divisions of the animal kingdom, tends to show that they in all cases pass through similar phases of development, except with respect to the last, or coloured stage of the nucleolated cell, which they do not attain in the lower classes of animals. He finds that the blood-corpuscles of the crab, according to an analysis made by Professor Graham, contain a sensible quantity of iron, perhaps as much as red corpuscles. He considers the corpuscles of the blood of the invertebrata, in as far as relates to the absence of nucleated cells, as resembling those of the lymph of vertebrate animals.